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REPLACEMENT PAGE 8

pipe_length$_2$ is the length of the pipe under test but in units of rotational time, e.g., in Servo

identifications (SIDs);

P(miss in 1 rev) is the probability of a "miss" which would require another disk rotation to execute

the command; in the preferred embodiment P(miss in 1 rev) can be obtained from a DEAT lookup table as

disclosed in U.S. patent ~~application~~ no. ~~09/638,253~~ 6,725,327, filed August 14, 2000 and incorporated herein

by reference;

penalty = time penalty of one revolution (time it takes the disk to revolve once); and

seek_time and extra_time are determined using SATF principles, e.g., using the SATF principles set

forth in the above-referenced patent publication. If desired, seek_time, extra_time, and pipe_length can be

measured in the same units, e.g., units of sector IDs.

The command with the highest throughput benefit score is executed at block 40.

In contrast, when the user has selected to optimize operation rate as indicated at block 42 of Figure

3, the logic moves to block 44 to calculate, for each command in the queue of the controller 28, a benefit

for maximizing the number of read and write operations per second using a number of commands extant in

the queue. With more specificity, the operation rate benefit provided by each command in the queue is

determined by:

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1. (currently amended) A hard disk drive (HDD) comprising:

at least one rotatable disk;

at least one data transfer element; and

at least one HDD controller controlling the data transfer element to execute commands in a queue, at least one command being selected for execution based on at least one of: an optimized throughput benefit, and an optimized operation rate benefit, wherein the throughput benefit is determined based at least in part on a pipe length.

2. (canceled).

3. (original)   The HDD of Claim 1, wherein the throughput benefit is related to a pipe length divided by the sum of a pipe length, a seek time, and an extra time.

4. (original)   The HDD of Claim 3, wherein a pipe length is a length of the sequential pipe of commands in at least one of: servo identifications (SIDs), and number of blocks in a pipe.

5. (original)   The HDD of Claim 1, wherein the operation rate benefit is determined based at least in part on a number of commands in a pipe.

6. (original)   The HDD of Claim 1, wherein the operation rate benefit is related to a number of commands in a pipe to be executed divided by the sum of a pipe length, a seek time, and an extra time.

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7. (currently amended) A hard disk drive controller executing logic comprising:

receiving a user selection of throughput optimization or operations per second optimization;

in response to a selection of throughput optimization, determining at least one next command to execute in a queue of commands by determining a pipe length and dividing the pipe length by the sum of a pipe length, at least one time period, and at least one probability; and

in response to a selection of operations per second optimization, determining a next command to execute in a queue of commands by determining a number of commands in a pipe and dividing the product by the sum of a pipe length, at least one time period, and at least one probability, wherein the next command is accessed for execution.

8. (original)   The controller of Claim 7, wherein the at least one time period is the sum of a seek time, and an extra time.

9. (original)   The controller of Claim 7, wherein the probability represents a miss probability.

10. (currently amended)   A HDD comprising:

at least one disk;

a controller writing data to and reading data from the disk in response to commands in a queue, the controller determining a command to execute by invoking at least one of:

means for determining a throughput benefit associated with executing each command; and

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means for determining an operational rate benefit associated with executing each command, wherein the means for determining a throughput benefit uses a pipe length in a numerator and a denominator of a quotient.

11. (canceled).

12. (currently amended)   The HDD of Claim [[11]] 10, wherein the means for determining a throughput benefit determines the pipe length and divides the pipe length by the sum of a pipe length and at least one time period and at least one probability.

13. (original)   The HDD of Claim 12, wherein the at least one time period is the sum of a seek time, and an extra time.

14. (original)   The HDD of Claim 12, wherein a pipe length is a length of the sequential pipe of commands in at least one of: servo identifications (SIDs), and number of blocks in a pipe.

15. (original)   The HDD of Claim 10, wherein the means for determining an operational rate benefit uses a number of commands in a pipe in a numerator and a pipe length in the denominator of a quotient.

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16. (original)   The HDD of Claim 15, wherein the means for determining an operational rate benefit

divides the number of commands by the sum of the pipe length and at least one time period and at least one

probability.

17. (original)   The HDD of Claim 16, wherein the at least one time period is the sum of a seek time,

and an extra time.

18. (original)   The HDD of Claim 16, wherein the probability represents a miss probability.

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